The vision of the Nebraska Energy Office is for Nebraska to have reliable and affordable sources of energy that support a cleaner environment and ensure security for our lifestyle and economy.

The mission of the Nebraska Energy Office is to promote the efficient, economic and environmentally responsible use of energy. Our principles: we value teamwork, are customer oriented, believe in creativity and innovation, are committed to excellence and pursue the highest standard of professionalism and integrity in serving the state's citizens.

In support of the agency mission, the following goals have been adopted:

- *Advance the conservation of traditional energy resources.*
- *Encourage the development of alternate and renewable energy resources.*
- *Advise the executive and legislative branches of state government in the development of energy policy.*
- *Utilize the Internet and computer technology to augment the delivery of information and services.*

The Programs

The Nebraska Energy Office operates a number of different programs. These programs can be categorized as follows: low-income weatherization, oil overcharge-funded activities, state energy program activities and organization activities. An overview of the 2004-2005 financial activity appears at the end of this section. The period covered by this report is from July 1, 2004 to June 30, 2005, except where noted.

Low Income Weatherization Assistance Program

The Energy Office administers this federally-funded program for weatherizing homes to save money and energy. Generally, the types of improvements made include wall and attic insulation and checking the energy efficiency and safety of furnaces, stoves and water heaters.

The agency is responsible for inspecting the homes that are weatherized and for monitoring the subgrantees, primarily community action agencies, that actually make the home weatherization improvements. In this reporting period, an estimated one-quarter of the homes weatherized were inspected by agency staff.

In fiscal year 2004-2005, 1,412 homes were weatherized by Energy Office subgrantees. This effort received a total of $5,111,100 from two sources: $2,494,453 from the U.S. Department of Energy's Low Income Weatherization Assistance Program and $2,616,647 from the Low Income Home Energy Assistance Program.

Since the program's inception in 1979, $98.22 million has been spent to make energy efficiency improvements in 57,176 homes. An estimated 53,000 homes of Nebraskans remain eligible for the weatherization program.

Energy savings resulting from weatherization typically last 20 years or longer. The cumulative savings since the program began are illustrated in Figure 1. Conservatively, estimated savings of $70.7 million have been achieved. About $4.2 million in new savings accrue annually.

Oil Overcharge Funds

Since 1982, Nebraska has received oil overcharge funds — also called petroleum violation escrow funds — as a result of various court actions against oil companies that overcharged their customers during the period of federal price controls from 1973 to 1981. Since direct compensation to injured consumers was not possible, the courts ordered the money be distributed to the states and

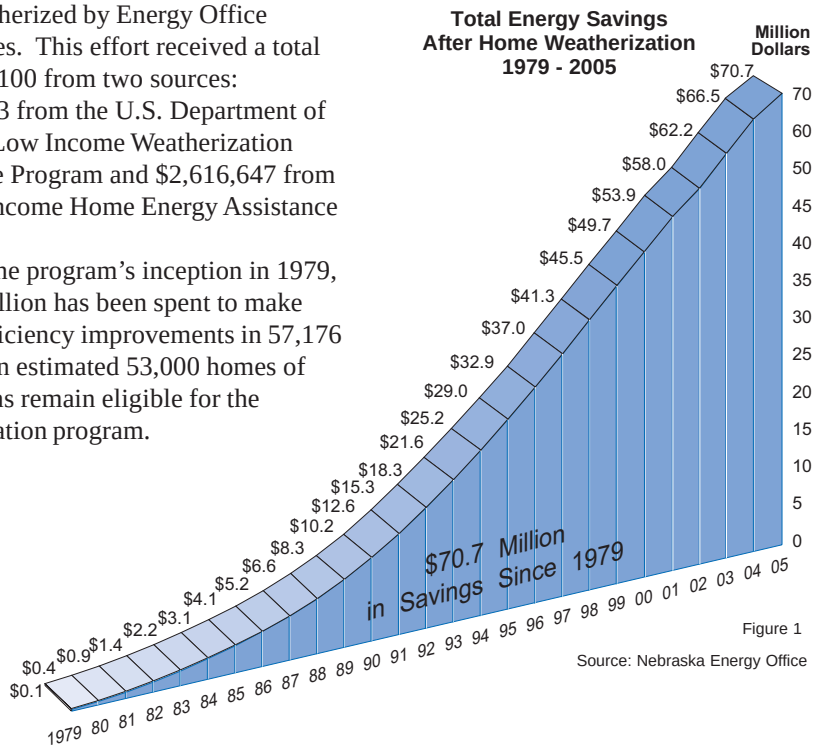

Figure 1

Source: Nebraska Energy Office

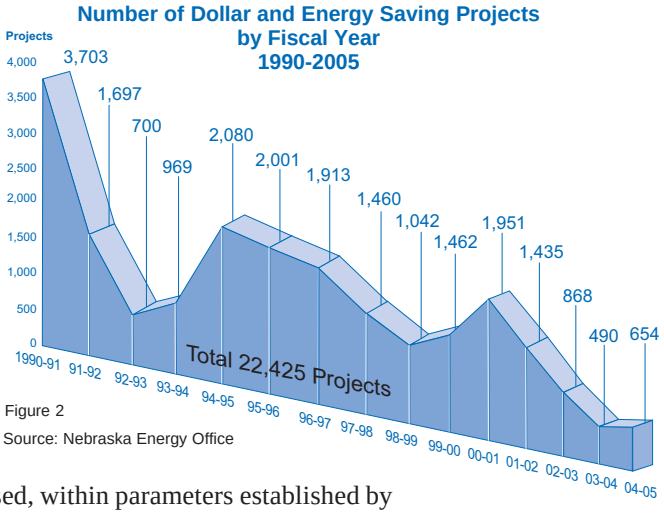

Figure 2

Source: Nebraska Energy Office

used, within parameters established by the courts and federal regulators, to fund energy assistance and efficiency programs.

The Legislature requires the Energy Office to annually report on disposition of these funds. A summary of Nebraska Energy Settlement Fund activities follows and is detailed in Figure 4 on page 3.

Dollar and Energy Saving Loans

This program, which was capitalized with oil overcharge funds and is re-charged with loan repayments, provides low-interest loans to Nebraskans to finance home, building, transportation and system improvements. Presently, 244 participating lenders at 711 locations provide five percent interest rate financing for up to 15 years on loans for energy saving improvements.

By June 30, 2005, 22,425 projects totaling more than $190.3 million have been financed with low-interest loans. Of that total, the Energy Office has provided more than $81.4 million which leveraged more than $84.6 million from Nebraska lenders. These projects also leveraged from borrowers an additional $15.5 million that was spent on non-eligible related improvements.

Loans have financed projects in all of the state's 93 counties. During the reporting period, 654 new projects were financed. The number of projects financed each year since 1990 is shown in Figure 2.

For reporting purposes, the agency categorizes loans into 11 types. More than 93 percent of the loan funds have financed improvements in just four categories: agriculture, mortgages, residential and small business. Summaries of several major loan categories appear in Figure 3 and are detailed as follows:

Agricultural Improvements

Improvements in agricultural equipment and systems rank fourth in the use of low-interest financing. More than 5.9 percent of all loan funds have financed typical agricultural projects such as low- pressure irrigation systems, replacing irrigation pumps and motors, making well modifications and replacing grain dryers. Since 1990, the Energy Office and lenders have financed 562 agricultural projects totaling $10.550 million.

Residential Improvements

More than 92 percent of the total number of the energy efficiency projects financed are in the homes of Nebraskans. More than 69 percent of all the funds loaned finance residential

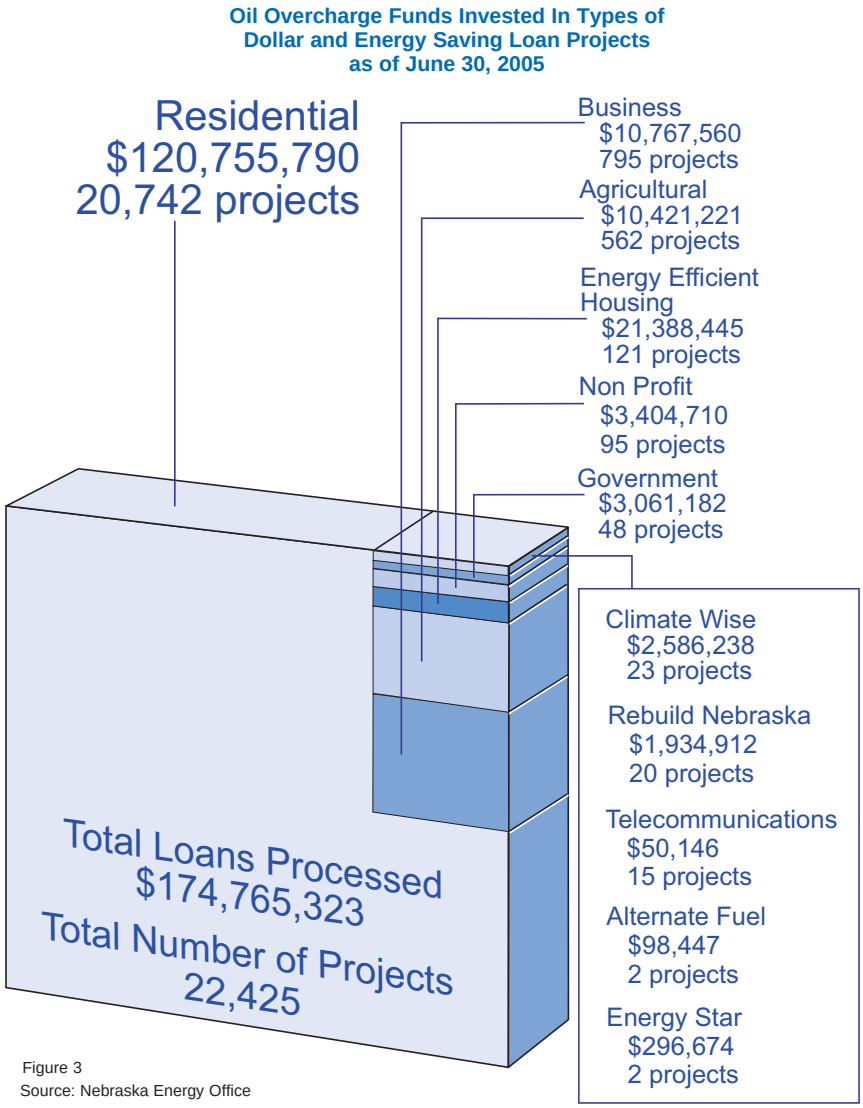

Figure 3

Source: Nebraska Energy Office

Nebraska Energy Settlement Fund
A Summary of *Exxon*, *Stripper Well* and *Diamond Shamrock*
Oil Overcharge Funds as of June 30, 2005

	Exxon	*Stripper Well*	*Diamond Shamrock*	Total
Funds Received	$15,504,944	$15,411,142	$359,172	$31,275,258
Interest Earned and Miscellaneous Income	$9,984,792	$7,446,707	$309,988	$17,741,487
Total	**$25,489,736**	**$22,857,849**	**$669,160**	**$49,016,745**
Funds Budgeted	**$25,489,736**	**$22,710,179**	**$669,160**	**$48,869,075**
Low Income Designated	**$0**	**$84,082**	**$0**	**$84,082**
Uncommitted Balance	**$0**	**$63,588**	**$0**	**$63,588**

Source: Nebraska Energy Office

Figure 4

improvements such as replacing or installing furnaces, air conditioners and heat pumps, replacing windows and doors and insulating walls and ceilings. To date, 20,742 projects totaling more than $120.755 million have been undertaken by Nebraskans.

Small Business Improvements

More than 6.1 percent of all energy efficiency financing, $10.767 million, have been used to make improvements in 795 buildings and systems in small businesses in the state. Typical small business improvements include replacement of furnaces and air conditioners as well as insulation, lighting and replacement doors and windows.

Native American Tribal Governments

The *Stripper Well* court order requires the state to provide an equitable share of oil overcharge funds to Native Americans. Based on their Nebraska population, $92,187 have been set aside for eligible projects. During the reporting period, $45,373 was provided to the Ponca Tribe of Nebraska for making energy saving improvements — replacing light fixtures and ballasts, 57 windows and installing two air conditioners — at the Fred Leroy Health Center in Omaha. This project was completed on March 31, 2005. All *Stripper Well* funds for Native Americans were spent.

Other Funds

Another $1,182 in *Diamond Shamrock* funds were spent on agency operating expenses.

State Energy Program

In 2004-2005, Nebraska received $432,000 for this federally-funded effort and supplied $86,400 in state funds from oil and natural gas severance taxes, as required matching funds.

These funds are used to provide energy efficiency services to consumers and other small energy users, and include the publication of this *Annual Report* and the *Nebraska Energy Quarterly* as well as maintenance of the state's energy database and web site.

These funds also provide program support for a wide array of activities that include energy shortage management and emergency preparedness, education and information, Dollar and Energy Saving Loans, residential and commercial building energy efficiency and management of competitive federally-funded State Energy Program Special Projects grants secured by the agency.

A number of activities are grouped under the State Energy Program, in part, because the federal energy department primarily funds them. The activities that occurred under each special projects grant during the reporting period is documented in this section.

Applying *Building America* Strategies to Buildings

This project was financed, in part, with a SEP *Building America* Special Projects grant totaling $99,334 received in October 2003. In collaboration with its design partner, the agency designed and built a value-engineered green built affordable home. The home was constructed by a certified green builder and served as a learning and training tool for builders, subcontractors and suppliers.

Work continued to develop a Nebraska climate specific design manual. The design manual will include house designs and specifications that meet the standards of the demonstration home constructed and researched through this project.

Affordable Green Built Home

As of June 30, 2005, $24,627 was spent. This project is scheduled for completion by September 30, 2006.

Putting the Pieces Together in Nebraska

This $29,855 SEP Special Projects *Building America* grant from the U.S. Department of Energy was received in September 2002. An Energy Office partner, the Nebraska State Home Builders Association advanced the knowledge and technical skills of its members through training and education for home remodelers and production builders.

During the reporting period, an educational symposium was organized for Nebraska builders at the National Renewable Energy Laboratory. The 11 participating builders were provided information about *Building America* concepts and use of value engineering in home construction.

As of June 30, 2005, $29,855 was spent. This activity was completed.

From 1983 Model Energy Code to 2003 International Energy Conservation Code

The Special Projects Codes and Standards grant of $32,223 was received from the U.S. Department of Energy and enabled the Nebraska Energy Office to provide 16 training workshops to local code officials, architects, engineers, homebuilders, heating and air conditioning installers and utility personnel before the July 1, 2005 effective date of the 2003 International Energy Conservation Code as the new Nebraska Energy Code. A total of 571 participants were trained at these workshops.

As of June 30, 2005, $31,678 was spent. This activity is scheduled for completion by July 31, 2005.

Other Projects

Some projects undertaken by the Energy Office are funded by other sources in the U.S. Department of Energy.

Biomass Roadmap

A $30,000 grant from the U.S. Department of Energy was received in October 2002 to begin the development of a Nebraska-based Biomass Roadmap. As part of the development process, Nebraskans were surveyed in eight biomass areas: agricultural residues, biodiesel, ethanol, methane, biopower, tallow, switchgrass and bioproducts. A web site, **http://zoped.unl.edu/websites/Biomass/**, incorporating the roadmap development was also created. The project was expanded to include the development of the Biomass Roadmap — Phase II. As approved by the Department of Energy, funds from this project and the Biopower Steering Committee were combined for this work. The work also included planning for a one-day Nebraska Biomass Energy Roadmap Workshop to be held in July 2005.

At the end of the reporting period, June 30, 2005, $26,682 was spent. This activity is scheduled for completion by September 30, 2005.

Biopower Steering Committee

A $24,000 grant from the U.S. Department of Energy was received in October 2002 to support activities of the state's Biopower Steering Committee, which was created in 1999. No state funds have ever supported Committee activities. Information about the Steering Committee is at **http://www.neo.state.ne.us//renew/biomass-biopower.htm**. The project was expanded to include development of the Biomass Roadmap — Phase II. As approved by the U.S. Department of Energy, funds from this project and the Biomass Roadmap were combined for this work. The work also included planning for a one-day Nebraska Biomass Energy Roadmap Workshop to be held in July 2005.

At the end of the June 30, 2005, $12,518 was spent. This activity is scheduled for completion by September 30, 2005.

Clean Cities: Omaha Public Power District's Power Drive

A $3,000 Clean Cities grant from the U.S. Department of Energy supported this program to educate and challenge high school students to design and build electric vehicles for competitions. During the reporting period, more than 68 high schools participated in seven rallies. Co-sponsors included the Nebraska Department of Education, Nebraska Public Power District, and Omaha Public Power District. More information about this activity is at **http://ww1.oppd.com/edu/powerdrive/index.cfm** As of June 30, 2005, $3,000 was spent. The project was completed September 30, 2004.

A new $2,000 Clean Cities grant from the U.S. Department of Energy continued support for this program to educate and challenge high school students to design and build electric vehicles for competition. Starting in April 2005, the 50 schools participating in Power Drive 2004-2005 began eight competitions. The final championship race was held May 7, 2005. The final competition results may be viewed at OPPD's Power Drive web site page at **http://ww1.oppd.com/edu/powerdrive/index.cfm** As of June 30, 2005, $2,000 was spent. This activity was completed June 30, 2005.

Energy Star

In April 2003, the agency received a $10,000 grant from the U.S. Department of Energy to promote ENERGY STAR® labeled products as part of the Nebraska Green Building Program's training and information activities to increase energy efficiency and environmental actions in new construction and remodeling in the residential sector.

ENERGY STAR® is a joint effort of the Environmental Protection Agency and the U.S. Department of Energy to identify the most energy efficient appliances, lighting, heating and cooling equipment.

During the reporting period, the agency promoted ENERGY STAR® materials at workshops, home shows and local Parade of Homes events. To date, $10,000 was spent. This project ended June 30, 2005.

High Resolution Wind Resource Maps

This project resulted in the creation of high resolution wind resource maps of Nebraska. By June 2005, new maps showing mean annual and seasonal wind speed, wind power density and other key factors at multiple elevations above ground level were available in electronic format at **http://www.neo.state.ne.us/renew/wind-renewables.htm**

This project was financed with $20,800 from U.S. Department of Energy funds, and contributions from Municipal Energy Agency of Nebraska, $300; Nebraska Public Power District, $2,000; and Omaha Public Power District, $1,900. All work was completed and all funds were spent.

State Heating Oil and Propane Program

During the reporting period, the Energy Office began its fourth year of participation in the U.S. Department of Energy's State Heating Oil and Propane Program. This activity

collects price information from a sampling of Nebraska suppliers selected by the Energy Information Administration from October through March which, in turn, is shared with the Energy Information Administration and then posted on the agency's web site at **http://www.neo.ne.gov/statshtml/86.html** and **http://www.neo.ne.gov/statshtml/87.html** The U.S. Department of Energy provided a grant of $6,000 for this activity. By the end of the reporting period, all funds were expended and the project was completed.

Wind Powering America — 2003

A $20,000 Wind Powering America grant was received in October 2003 from the U.S. Department of Energy. Half of the grant funds were used to partially underwrite a deliberative poll by Nebraska Public Power District to ascertain customers' support for renewable energy. Other activities included coordinating informational meetings on USDA renewable energy grants and development of a web site, **http://www.nmppenergy.org/KimballWindProject/index.htm** , for the Municipal Energy Agency of Nebraska's wind energy project at Kimball. This activity was completed on September 30, 2004 and all funds were spent.

Wind Powering America — 2004

This $20,000 Wind Powering America grant was received in April 2004 from the U.S. Department of Energy. With this grant, a web site for Nebraska Public Power District's Ainsworth wind project was developed: **http://www.nppd.com/About_Us/Energy_Facilities/facilities/wind_generation/default.asp**, the agency's web-based wind energy resources were upgraded **http://www.neo.state.ne.us/renew/wind-renewables.htm** and USDA renewable energy grants were promoted. As of June 30, 2005, all work was completed and all funds were spent.

Nebraska Ethanol Board Support for the Governor's Ethanol Coalition

A grant from the U.S. Department of Energy for $125,000 was passed through to the Nebraska Ethanol Board to support meetings and work for the Governors' Ethanol Coalition.

As of June 30, 2005, $125,000 was passed through to the Nebraska Ethanol Board. This activity is scheduled to be completed September 30, 2005.

Peer Exchange

A $2,500 grant from the U.S. Department of Energy enabled agency staff to participate in various activities such as training, regional meetings or national conferences. As of June 30, 2005 all funds were spent.

Organizations

The Energy Office serves as the headquarters for four state, regional, national and international organizations:

Governors' Ethanol Coalition

Nebraska was the driving force in the Coalition's creation in 1991. Today, there are 32 members from Hawaii, Oregon and Washington in the West to the Carolinas and New York in the East. There are also five international members. The members are identified in Figure 5.

An Energy Office staff member is one of the Nebraska governor's representatives for the group. The Energy Office serves as the Coalition's administrative headquarters, handling fiscal, media and operational matters.

Governors' Ethanol Coalition Members

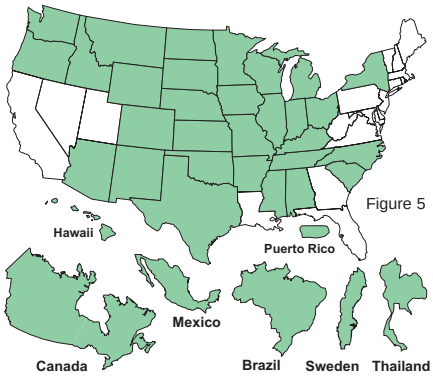

Figure 5

During 2005, the Governors' Ethanol Coalition proposed the following three recommendations to Congress and to the Administration to expand the use of ethanol:

National Renewable Fuels Security Standard and Performance-based Incentives. Enact a National Renewable Fuels Security Standard requiring the use of at least 8 billion gallons a year of ethanol and biodiesel by 2012.

Research and Development. From existing federal research funds, including those from the Departments of Defense, Energy, Agriculture, and Transportation, as well as the Environmental Protection Agency, provide a targeted, substantial investment in research, applied fundamentals, and innovation to address the recalcitrance of biomass, expand co-products, and make advances in feedstock production.

Commercialization and Production Incentives. One of the most significant barriers to commercialization of biomass ethanol technology is the unproven nature of the technology in large-scale commercial facilities. The Coalition recommended that the federal government offer market-based incentives for commercial demonstration and technology application to support large-scale operations resulting in production of 1 billion gallons a year of biomass-derived ethanol by 2015 at a cost that is competitive with gasoline and diesel.

Congress included every recommendation in the *Energy Policy Act of 2005*, but reduced the renewable fuels standard to 7.5 billion gallons by 2012, which the President signed into law. Although Congress authorized the funding levels recommended by the Coalition, specific appropriations had to wait for Congress to convene in January 2006.

As of late December, the nation appeared to be on track to replace five percent of the nation's transportation

fuel with domestically produced ethanol and biodiesel by 2012 — a tremendous achievement.

Governors' Public Power Alliance

This bi-partisan coalition of six governors was formed so consumers served by publicly-owned electric systems would not be disadvantaged as the electric industry was restructured.

Governors' Public Power Alliance Members

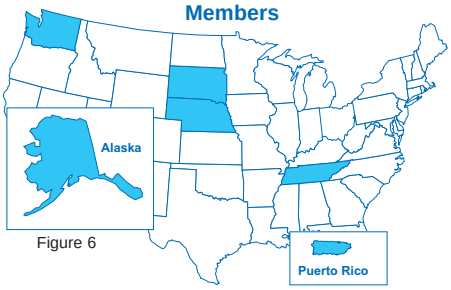

Figure 6

Nearly one-quarter of the nation is served by consumer-owned systems, including all electric utilities in Nebraska.

Formed in 1998, the governors of Nebraska and Tennessee serve as co-chairs of the Alliance.

During the reporting period, the Alliance continued to monitor federal legislative restructuring activity — especially the comprehensive energy bill considered by Congress — making its position known.

Western Regional Biomass Energy Program

Since 1997, the Energy Office has had a variety of roles for the federally-funded Western Regional Biomass Energy Program: grant recipient, administrator of the 13-state region, and host and maintenance operator of the program's web site at **http://www.westbioenergy.org/**

Since the agency began administering the program in 1997, $1.725 million in grants were competitively selected and awarded for various biomass projects in the 13 states in the region. The grant program ended December 31, 2003. Since that time, the U.S. Department of Energy authorized the Energy Office to continue grant administration, maintain the web site and pass-through federal funds to the Nebraska Ethanol Board to provide continued support to the Governors' Ethanol Coalition. The agency's involvement with the regional program ended in December 2005.

As of June 30, 2005, $3,664,585 was spent. This grant is scheduled for completion on December 31, 2005.

Biopower Steering Committee

Authorized by the Legislature through 2008, the Energy Office provides assistance to this 12-member group. The Committee's task is to foster the use of bio-based resources as energy production resources.

Financial Activity

In 2004-2005, the expenditures for the agency totaled $9,296,801 and includes federal, state, oil overcharge and miscellaneous state funds. The source of the funds is illustrated in Figure 7. More than 67 percent was derived from federal sources. Nearly 29 percent of the funding came from oil overcharge accounts.

More than 56 percent of all federal funds were spent as aid in the Low-Income Weatherization Assistance Program. More than 28 percent of all expenditures were used for oil overcharge aid primarily in the form of Dollar and Energy Saving Loans and are detailed on pages one through three in this report. Complete expenditure details are found in Figure 8.

Where the Money Came From as of June 30, 2005

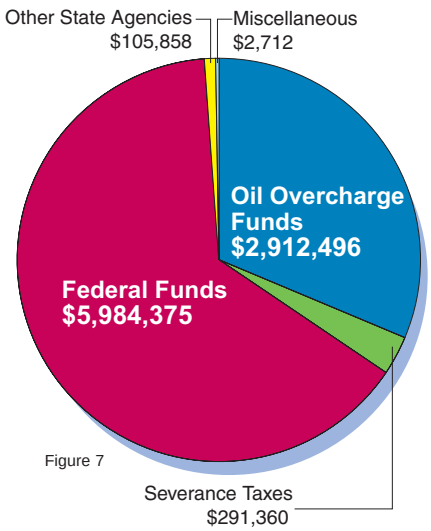

Figure 7

Where the Money Went as of June 30, 2005

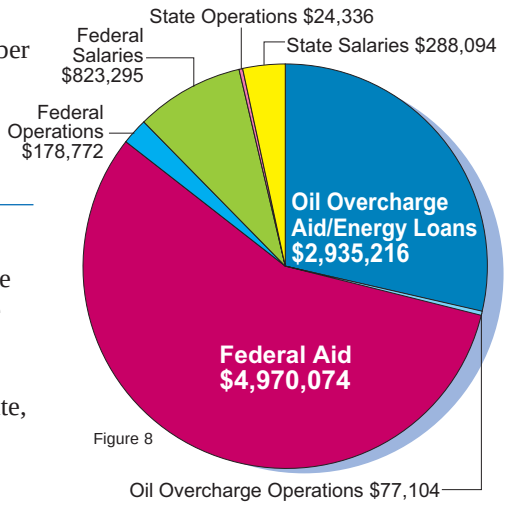

Figure 8

(1) On or before February 15 of each year, the Director of the State Energy Office shall transmit to the Governor and the Clerk of the Legislature a comprehensive report designed to identify emerging trends related to energy supply, demand, and conservation and to specify the level of state-wide energy need within the following sectors: Agricultural, commercial, residential, industrial, transportation, utilities, government, and any other sector that the director determines to be useful.

(2) The report shall include, but not be limited to:

(a) An assessment of the state's energy resources, including examination of the current energy supplies and any feasible alternative sources;

(b) The estimated reduction in annual energy consumption resulting from various energy conservation measures;

(c) The status of the office's ongoing studies;

(d) Recommendations to the Governor and the Legislature for administrative and legislative actions to accomplish the purposes of sections 70-625, 70-704, 81-1602, 81-1606, and 81-1607; and

(e) The use of funds disbursed during the previous year under sections 81-1635 and 81-1641. The use of such funds shall be reported each year until the funds are completely disbursed and all contractual obligations have expired or otherwise terminated.

Nebraska Revised Statutes 81-1607

Trends and Needs

The Nebraska Energy Office follows the trends in different energy sectors as part of its mission. These trends can portend future energy use.

In all cases, the most current energy data has been used in this report. Detailed energy data required to be maintained by the Energy Office can be found at the agency's web site **http://www.neo.ne.gov/statshtml/index3c.html**

State-wide Energy Need and Cost

In 2001, the state's total energy consumption was 627.1 trillion British thermal units, a decrease of less than one percent from 630.9 trillion British thermal units in 2000. Petroleum, hydroelectric, ethanol, natural gas, wood and waste demand declined in 2001 as compared to 2000. Use of nuclear and coal increased in 2001 over 2000.

(2001 is the most recent year for which consumption, expenditure and price data are available.)

Total energy expenditures in 2001 increased 2.4 percent above 2000 figures to $4.4 billion. Expenditures for petroleum, accounted for 50 percent of the total, and natural gas accounted for 20 percent of the total .

The prices for different types of energy, as compared to other states , reveals Nebraskans paid the lowest price for coal in the nation in 2001, and less than half the national average. The rankings are calculated by the Energy Information Administration (EIA). Electricity ranked at 44 in price, and gasoline at 29. Natural gas, another key energy source for Nebraskans, ranked 25 in price.

According to the EIA, Nebraska ranked 36 in 2001 in total energy expenditures among the 50 states and the District of Columbia (California was the highest and the District was the lowest). The state was 18 in the ranking of expenditures per person at $2,567 (Wyoming was the highest and Florida was the lowest).

Agricultural

Energy Supply

Energy supplies for the agricultural sector of the state's economy have been met. Any supply problems have been limited to infrequent shortfalls of petroleum products usually during periods of peak demand.

Demand

Energy demand information for the agricultural sector is not available on a consistent and annual basis. National energy databases merge agricultural energy use with data from the industrial sector.

Conservation

Over the years, agricultural producers have used a number of different approaches to conserve energy use. Energy reduction practices used have included conservation tillage and irrigation pump testing, scheduling and load management. The Energy Office provides low-cost financing for irrigation efficiency projects that demonstrate energy savings such as low-pressure pivots and replacement pumps and motors. Other farming and ranching energy efficiency projects such as grain dryers have also been financed with low-interest loans.

Typically, high fuel costs or limited availability of energy resources induces demand for efficiency practices in this sector.

For example, record high prices for natural gas and diesel fuel have caused farmers to alter their current practices such as when and how much anhydrous ammonia fertilizer, a natural gas product, is used. To combat high diesel fuel prices, some farmers are adopting conservation tillage practices.

Energy Need

Energy costs are a significant agricultural expense. As farm size has increased, energy has replaced labor, allowing fewer people to produce larger volumes of agricultural goods.

The energy needs of the state's agricultural producers can fluctuate dramatically from growing season to growing season. For example, a 30 percent increase in gasoline and diesel use in 2001 was primarily due to increased irrigation use as a result of drought conditions in some areas of the state.

Fuel substitution or conversion to other types of fuel are very difficult for this sector to utilize.

Commercial

This sector which includes non-manufacturing business establishments closely parallels consumer economic activity in the state and includes energy use by local, state and federal governments.

Energy Supply

For the most recent five year reporting period, 1996-2001, at least 93 percent of the energy used in this sector came from only two sources: natural gas and electricity. Supplies of both energy resources were plentiful. However, prices for natural gas departed substantially from historically stable price patterns.

Trends indicate these fuel types will remain the predominant fuel choices of this sector in the near term.

Demand

A multi-year trend of declining demand in the commercial sector was broken in 2000 and resumed in 2001. Net energy use decreased 1.3 percent to 62.6 trillion British thermal units. Total energy use also decreased by 0.9 percent to 129.8 trillion Btus. Demand for all types of fuel: electricity, up 0.3 percent from 2000; natural gas down 2.7 percent; petroleum use down 2.3 percent; and renewable energy use down 9.1 percent.

Conservation

Reductions in energy use in the commercial sector generally follow patterns found in the residential sector. Efforts to conserve energy use tend to be economically driven, especially when fuel prices rise above historic levels.

Energy Need

Because the predominant energy needs of the commercial sector are confined to readily available supplies of natural gas and electricity, no supply problems are likely if natural gas supplies are readily available.

Residential

Energy Supply

Nearly 90 percent of the energy used in the residential sector in 2001 came from only two sources: electricity and natural gas. More than half the energy used in this sector comes from natural gas. There are available supplies of both types of energy.

Demand

Demand in the residential sector in 2001increased in net energy use nearly six percent over 2000 to 85.9 trillion British thermal units. Substantial increases in 2001 were reported in electricity, up 3.5 percent and natural gas, up 11.1 percent.

The 40-plus-year trend of increasing use of electricity in households, from 6.51 trillion Btus in 1960 to 29.47 trillion Btus in 2001, illustrates the wide adoption by Nebraskans of energy-using technologies such as televisions, microwave ovens and computers.

Conservation

Most natural gas in the residential sector is used for home heating and minor household uses such as heating water, drying clothes and cooking.

Like most of the other sectors, residential users are extremely responsive to dramatic price rises. Increases in the price of natural gas, at various times over the decades, have resulted in reduced average annual consumption. Higher than normal heating bills have propelled homeowners to make energy saving improvements such as replacing furnaces, windows and adding insulation.

Energy Need

Energy need in this sector for the two major fuel types — natural gas and electricity — is likely to be determined in predicable ways: severity of winter and summer weather conditions and price volatility. The combined impact of a return to normal winter weather patterns coupled with high natural gas prices — as occurred in 2000-2001 — would likely result in predictable behavior: a surge in replacement of inefficient heating equipment, reduction in use and fuel switching by replacing natural gas furnaces with electric-powered heat pumps. A string of 100 degree summer days can also lead to replacement of broken or old air conditioners with new energy efficient models which can reduce energy use.

Industrial

The industrial sector includes manufacturing, construction, mining, agriculture and forestry operations.

Energy Supply

The industrial sector relies on more diverse types of fuel than other sectors. Natural gas, electricity, coal and various petroleum products — gasoline, asphalt, road oil and propane and diesel — are the primaryenergy types utilized in this sector's operations. Generally, supplies of all fuel types have been readily available.

Demand

In four decades, total energy demand in this sector has grown from 93.0 trillion Btus in 1960 to 182.4 trillion Btus in 2001. Demand grew significantly for electricity, propane and diesel fuel while a decline was recorded for gasoline over the 40-year period.

Conservation

Over the years, the industrial sector has been more likely to make energy efficient system and building

improvements, especially if energy costs are a significant factor in the cost of doing business.

The impact of conservation efforts are most clearly seen in natural gas use in this sector when usage peaked in 1973 at 73.7 trillion Btus. Demand subsequently fell precipitously after the energy price shocks of the 1970s to a low of 20.3 trillion Btus in 1986.

Energy Need

Energy need in the industrial sector is also subject to the ebb and flow of national and regional economic trends which can cause spikes or declines in energy demand.

Growth trends in this sector can also be affected by industrial expansions in the state. For example, the significant increase in ethanol production in the mid-1990s caused a substantial increase in natural gas need in this sector.

Based on past use patterns, increased need for electricity by this sector is likely. Energy need for other energy resources is impossible to predict.

Transportation

In addition to traditional methods of transportation — public and private vehicles, railroads, aircraft and boats — this sector includes energy used to transport natural gas through pipelines.

Energy Supply

The transportation sector in Nebraska is almost exclusively dependent upon petroleum-based fuels. This level of dependency on petroleum has not essentially changed since 1960, when record-keeping began.

Demand

Demand in this sector nearly doubled since 1960, rising from 94.2 trillion Btus to 162.6 trillion Btus in 2001. In 2001, energy demand decreased by six percent from 2000, falling from 172.8 trillion British thermal units. Demand for diesel fuel increased more than six-fold in the same period from 8.17 trillion Btus to 50.4 trillion Btus in 2001. Gasoline and diesel fuel account for nearly 93 percent of the resource types used in the transportation sector.

Factors that affect growth in this sector include population growth, replacement of vehicles with less efficient ones and the number of miles traveled each year.

Conservation

The transportation sector is especially immune to conservation efforts. Over the decades, a variety of approaches by the state and federal governments have been tried: mandated Corporate Average Fuel Efficiency standards, reduced highway speed limits, introduction of efficiency technology in vehicles and driving modifications such as right-turn-on-red lights and carpooling/ridesharing.

Recent trends in this sector have run counter to conservation efforts. Price rises can induce conservation behavior, but typically the actions are limited and have not been sustained in the long term.

Energy Need

Based on past demand trends in this sector, continued growth in energy use seems likely.

Utilities

Information in this sector consists exclusively of energy trends and needs by the state's electric utilities.

Energy Supply

Trends in the electric power sector in Nebraska have remained generally constant over time: more than 90 percent — 95 percent in 2001 — of the fuels used to generate, distribute and transmit electricity has come from just two resource types: coal and nuclear electric power. In-state hydropower resources used to generate electricity also remained generally constant over the recent past, averaging about five percent a year.

Demand

Since 1960, energy demand by electric utilities increased more than six-fold from 50.2 trillion Btus to 323.9 trillion Btus in 2001. Increases in demand have been recorded each year between 1995 and 1999. Demand declined by 2.7 percent in 2000, but then increased by 4.4 percent in 2001.

Conservation

Efficiency efforts in the electric power sector result from technological advances, either by the utility or the user.

One key target of efficiency improvements for utilities is reducing electricity losses during transmission. While technological breakthroughs can address part of the problem, other improvements can also be made. For example, local utilities estimate standard line loss at seven percent, but in some cases actual losses can be more than double that amount if preventive maintenance is not performed on a regular basis on the utility lines.

Energy Need

Nebraska utilities remain net exporters of electricity. The amount of electricity exported reached a peak of 7.2 billion kilowatthours in 1999. In 2001, utilities exported 5.7 billion kilowatthours, an estimated 18.7 percent of net generation that year.

Continued growth in need will result in additional capacity requirements. Several of the state's largest utilities have begun the process for adding generation assets. For new base load and peaking facilities, the utilities are planning to use coal and natural gas, respectively, and they have also identified smaller generation options using wind and biogas.

State Energy Resources Assessment

Current Supplies

Nebraska is not an energy resource-rich state.

Oil has been produced in the state since 1939. Oil production peaked in 1962 and has declined significantly since then. In 2004, oil production declined to 2.507 million barrels from 2.755 million barrels in 2003, a decrease of 9 percent from 2003. In 2001 (the latest year for consumption data), the state's crude oil production represented only 7 percent of the petroleum products used in the state in that year.

Natural gas has been produced in the state since 1950. Natural gas production peaked in 1960 and has declined precipitously since with a few infrequent increases in production, the last one occurring in 2003 and 2004. In 2004, 1.498 billion cubic feet of natural gas was produced, an increase of 28 million cubic feet, or 1.9 percent, over natural gas production in 2003. In 2001, natural gas production represented only one percent of the natural gas consumed by Nebraskans.

The state's coal resources are insignificant and not economical to mine. However, the state's proximity to Wyoming's low-sulfur coal beds in the Powder River Basin allows Nebraska ready access to this resource used in electricity production.

Uranium has periodically been mined in the state, but must be sent outside the state's border for processing.

During the reporting period, there were 12 operational wind turbines generating electricity: Springview, 2; Lincoln, 2; Valley, 1; and Kimball, 7. In 2005, more than 97 million kilowatthours — enough for more than 15,000 homes — were generated. Energy generated by the turbines is estimated to supply less than one percent of energy consumption in Nebraska, based on 2001 consumption data.

Alternatives

There are five main alternate energy sources available in Nebraska: biomass, geothermal, hydropower, solar and wind. Maps and other specific information about the state's alternative energy resources can be found at **http://www.eere.energy.gov/states/alternatives/resources_ne.cfm**

In 2001, an estimated three percent of the state's total energy consumption was met from renewable resources. Total energy consumption in 2001 was 627.1 trillion Btus of which 18.6 trillion Btus came from renewable sources.

Assessments of the five feasible alternatives follow:

Biomass

In 2001, wood and waste provided an estimated 4.4 trillion Btus, less than one percent of the state's energy need. A small but growing amount of electricity is being generated from methane at former landfills and at sewage facilities.

The most significant biomass energy resource in Nebraska continues to be ethanol that is produced from corn and grain sorghum. In 2001, an estimated 2.3 trillion Btus — almost 28 million gallons — of ethanol were consumed in Nebraska and represented about 0.4 percent of the state's total energy need.

In 2005, there were 11 operating plants that produced an estimated 543 million gallons of ethanol, an increase of 5.4 percent over the volume produced in 2004. An additional nine ethanol plants are expected to be operational and three plants will complete expansions by 2007.

The state's ethanol board estimates that 25 percent of Nebraska's corn crop and the equivalent of three-quarters of the state's grain sorghum crop were used to produce ethanol in 2005. As production increases, these percentages will also increase.

Geothermal

There are two types of geothermal resources that can be utilized: hydrothermal fluid resources and earth energy. According to the Energy Information Administration, there are two pockets of high-temperature hydrothermal fluid resources in the north central and northern Panhandle portions of the state. This resource might be suitable for electricity generation, however, development appears unlikely in the foreseeable future.

Earth energy can be used directly to provide heat in a variety of applications, such as geothermal heat pumps and appears to offer Nebraskans a way to utilize this resource. Growth in the use of geothermal heat pumps that can discharge waste heat into the ground in hot weather and extract heat from the ground during cold weather appears strong and is being promoted by the state's larger electric utilities.

In 2001, an estimated 0.35 trillion Btus were produced from geothermal resources in the state.

Hydropower

In 2001, 62 percent, 11.4 trillion Btus, of the renewable energy used in Nebraska came from hydropower sources. The electricity generated by the hydro resources came from 11 dams in or on the border of the state and from power supplied by Western Area Power Administration. Typically, the amount of hydropower generated is relatively constant from year to year, unless affected by drought conditions. As the state's energy need continues to grow, less and less of the need will be met by hydro resources.

According to a study by the Energy Information Administration and the Idaho National Engineering and Environmental Laboratory, an estimated 2.348 million megawatt hours of electricity could be produced from hydropower resources, meeting about 9 percent of the state's electricity needs in 1998. However, it is unlikely any additional hydropower resources in Nebraska will be developed.

Solar

According to the Energy Information Administration, Nebraska has good solar resources especially in the western part of the state. Based on that assessment, the federal agency estimated that a flat panel photovoltaic system the size of a football field would generate enough electricity to meet the needs of more than 103 households. A tracking-type photovoltaic system installed in western Nebraska on 150 acres would generate enough electricity to meet the needs of more than 4,330 households.

Current solar technology deployed by utilities in the state is limited to meeting the needs of cattle ranchers in remote regions where photovoltaic systems are less expensive than installing new power lines.

In 2001, an estimated 0.014 trillion Btus were generated from solar thermal and photovoltaic resources in the state.

Wind

An Energy Information Administration analysis of Nebraska's wind resources concluded approximately 46 percent of the state contained good wind speeds suitable for development. If all of these resources were developed, only 4.6 percent of the land would be used, and an estimated 869 million megawatt hours of electricity could be produced annually.

The outlook for an increase in wind generation capacity appears optimistic. During the reporting period, Nebraska Public Power District began construction of a wind turbine facility near Ainsworth. The 60 megawatt facility should become operational in October 2005. The electricity produced from the project will meet the needs of about 19,000 households. About half of the output of the wind project will be utilized by other utilities including Omaha Public Power District and the Municipal Energy Agency of Nebraska.

Interest in residential scale wind turbines, capable of meeting the needs of a single household, is also rising. At least one planned residential-scale turbine owner plans on interconnecting to the grid to be able to sell excess power to the local utility.

Estimated Energy Consumption Reduction

Several evaluations have been conducted by the Energy Office that quantified energy consumption reductions that resulted from activities sponsored by the agency:

- A typical home weatherized under the agency's federally-funded program achieves a 25 percent or greater reduction in space heating needs, and saves an estimated $152 a year in energy costs.
- Replacement natural gas fueled furnaces installed and financed with Dollar and Energy Saving Loans from the agency realized a 10.7 percent reduction in energy use for 80 percent efficient furnaces and a 19.2 percent reduction in energy use for 90 percent efficient furnaces.

Status of Ongoing Studies

The Nebraska Energy Office had no ongoing studies underway during this period.

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